Transformer Range
HeavyPower - TSH Series

High power modular connectors
Smiths Interconnect offers an extensive range of superior contact technologies suitable for harsh environments and power applications. Hypertac® (HYPERboloid conTACt) is the original superior performing hyperboloid.

The Tortac® hyperboloid contact is an evolution of Hypertac® maintaining the best electrical performance with excellent mechanical and environmental reliability. On balance, Tortac® is the ideal compromise when mating cycle life performance and vibration resistance are important, but not to the levels requiring the original Hypertac® contact.

### Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low insertion/extraction forces</strong></td>
<td>The Tortac® design, inspired by the Hypertac contact, provides a low insertion force thanks to smooth contact surfaces and the shape of the spring cage.</td>
</tr>
<tr>
<td><strong>Long contact life</strong></td>
<td>The Tortac® hyperboloid contact is tested to over 500 mating cycles.</td>
</tr>
<tr>
<td><strong>Lower contact resistance</strong></td>
<td>The design provides a far greater contact area than competing designs and the wiping action of the contact beams insures a clean and polished contact surface.</td>
</tr>
<tr>
<td><strong>Immunity to shock &amp; vibration</strong></td>
<td>Tortac® has been designed to resist high levels of mechanical shock and vibration. Material shapes and surfaces in the contact design provide high reliability under severe conditions.</td>
</tr>
<tr>
<td><strong>High density interconnect systems</strong></td>
<td>Significant reductions in insertion force allow ergonomically comfortable levels of connector insertion force. No additional mating hardware is required to overcome insertion and extraction forces even for multipole connectors.</td>
</tr>
<tr>
<td><strong>Low cost of ownership</strong></td>
<td>Affordable option for applications which need ultimate dependability but without extremely high cycle life.</td>
</tr>
<tr>
<td><strong>Low power consumption</strong></td>
<td>Thanks to the low contact resistance and the smart design, the temperature rise due to current is compliant to the NF F 61-030 and EN 50467.</td>
</tr>
<tr>
<td><strong>Reliability under harsh environments</strong></td>
<td>Harsh environmental settings require connectors that will sustain their electrical integrity even under the most demanding conditions such as shock and vibration.</td>
</tr>
</tbody>
</table>
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Applications

Meeting all On-Board Power application requirements

HeavyPower Connectors - TSH Series
The HeavyPower connectors are part of the Smiths Interconnect Transformer range, a comprehensive series of high density, modular connectors for all on-board power applications within the rail market. The Transformer’s modularity enables customers to design their own solution by supplying the elementary components of the whole connector. It employs a unique do-it-yourself system based on the building block principle. The connectors are suitable for any applications requiring the transmission of very high currents such as power distribution, intercoaches and bogies. There is also a version available that connects the motors of the bogies.

Value Proposition
- Modularity with easy kitting devices offers a cost saving on total cost of ownership
- Flexible solution with several crimp section of cable per contact size offering cost saving with standardization of contact size and limitation of crimping tools
- Coding devices to allow side by side installation
- Integrating anti swing accessories to avoid extra fixing cables devices on the gangway
- Long life cycle with Tortac® power contact derived from hyperboloid technology
- Robust and complete cable harness/jumpers shielded and non shielded solutions increasing reliability and SIL4 applications
- Reduced maintenance costs and easy retrofit operation with removable and interchangeable modules and contacts
- The connector is equipped with a cable gland (strain relief) to protect the cable and the connectors from the mechanical and environmental hazards
- It has been tested up to 1 Million of swaying cycles to simulate the gangway environment
- Compliant with the main rail standards (EN 45545 and NF F 61-030)
# How To Order

**HeavyPower Connectors – TSH Series**

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

## 1 HeavyPower Connector Series

[Fixed]

## 2 Connector version

- **S** Straight
- **R** Right angle
- **Y** Branch

## 3 Connector type

- **M** Male
- **F** Female

## 4 Contact arrangement

(Each digit corresponds to a pole, please configure each pole according to the requested cable section)

- **O** Without any pole
- **A** 25 mm², crimp copper
- **K** 70 mm², crimp copper
- **D** 35 mm², crimp copper
- **G** 50 mm², crimp copper

For example, the reference for the contact arrangement of a 3 pole version can be **DAG00**

This means that the 1st pole is equipped with a crimp contact for 35mm² cable section, the 2nd one for 25mm² and the 3rd one for 50mm². The last 00 digits indicate that no contact is required.

## 5 Cable gland

(Each digit corresponds to a pole, please configure each pole according to the requested cable gland)

- **O** Without any pole
- **A** Ø 9.5 to 10.5 mm
- **C** Ø 13.5 to 15.0 mm
- **D** Ø 15.0 to 17.0 mm
- **B** Ø 10.5 to 13.5 mm
- **E** Ø 17.0 to 19.0 mm

## 6 Protection

- **B** Balast [Fixed]

## 7 Swing equipment

- **S** With (TSH./TSHY)
- **0** Without (TSHY only)

## 8 Accessories

[Fixed]

The connectors are also available as self-assembly components. Please contact Smiths Interconnect for the individual part numbers.
# Technical Characteristics

## HeavyPower Connectors – TSH Series

### Technical

| Number of contacts | 1 to 4 per connector  
<table>
<thead>
<tr>
<th></th>
<th>TSHY 4 entries / 8 exits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact pin diameter</td>
<td>Ø10 mm</td>
</tr>
</tbody>
</table>

### Electrical

(EN 50124 designed and tested)

<table>
<thead>
<tr>
<th>Current rating</th>
<th>Up to 300 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating</td>
<td>3600 V</td>
</tr>
<tr>
<td></td>
<td>according to EN 50124-1</td>
</tr>
<tr>
<td>Withstanding voltage rating</td>
<td>12 kV</td>
</tr>
<tr>
<td>Rated impulse voltage $[U_{im}]$</td>
<td>25 kV</td>
</tr>
</tbody>
</table>
| Overvoltage category | OV3 PD3A  
|                       | according to EN 50124-1 |

### Physical & Environmental

(NF F 61-030 / EN 50467 tested)

<table>
<thead>
<tr>
<th>Temperature rating</th>
<th>-55°C to +125°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact material</td>
<td>Copper, nickel-plated</td>
</tr>
<tr>
<td>Contact retention</td>
<td>According to 11.5.5 NF F 61-030</td>
</tr>
<tr>
<td>Insulator</td>
<td>Polyamide (CTI &gt;600)</td>
</tr>
<tr>
<td>Body shells</td>
<td>Passivated aluminium</td>
</tr>
<tr>
<td>Endurance</td>
<td>&gt;500 mating cycles</td>
</tr>
</tbody>
</table>
| Vibration resistance| According to EN 61373  
|                     | harshest environment |
| Flammability        | HL3 - R22/R23  
|                     | according to EN 45545 |
| Acid resistance     | According to NF F 61-030 |
| Fluid resistance    | According to NF F 61-030 |
| Corrosion resistance| 96 hrs salt spray  
|                     | over 500 hrs mated |
| Protection level    | IP66, IP67 |
**Dimensions**

*HeavyPower Connectors – TSH Series*

**HeavyPower right angle termination**

<table>
<thead>
<tr>
<th>Pole number</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>102.5</td>
<td>85.5</td>
</tr>
<tr>
<td>2</td>
<td>145</td>
<td>128</td>
</tr>
<tr>
<td>3</td>
<td>187.5</td>
<td>170.5</td>
</tr>
<tr>
<td>4</td>
<td>230</td>
<td>213</td>
</tr>
</tbody>
</table>

Dimensions are in mm

**HeavyPower straight termination**

<table>
<thead>
<tr>
<th>Pole number</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>94.5</td>
<td>72.5</td>
</tr>
<tr>
<td>2</td>
<td>137</td>
<td>115</td>
</tr>
<tr>
<td>3</td>
<td>179.5</td>
<td>157.5</td>
</tr>
<tr>
<td>4</td>
<td>222</td>
<td>200</td>
</tr>
</tbody>
</table>

Dimensions are in mm
HeavyPower Y, branch connector

Example of connector configurations

<table>
<thead>
<tr>
<th>Pole number</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>91.5</td>
<td>109.4</td>
</tr>
<tr>
<td>2</td>
<td>133.9</td>
<td>151.9</td>
</tr>
<tr>
<td>3</td>
<td>176.4</td>
<td>194.4</td>
</tr>
<tr>
<td>4</td>
<td>218.9</td>
<td>236.9</td>
</tr>
</tbody>
</table>

Dimensions are in mm
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